10/577909 JP0500163

IAP12 Rec'd PCT/PTO 01 MAY 2006

CLAIMS

1. (Amended) A failure sensing device of a vehicle control system including a control unit (100, 110, 120) generating a control target based on an operation request for controlling a driving state of a vehicle by manipulating a corresponding actuator using the generated control target, and a processing unit (200, 300) connected to said control unit (100, 110, 120) by a network, for generating and providing to said control unit (100, 110, 120) additional information to be used to modify said operation request or said control target, as necessary, at said control unit (100, 110, 120), wherein

said failure sensing device is provided to said control unit (100, 110, 120) with smaller control load, and includes

an output portion outputting information to said processing unit (200, 300) with greater control load,

a receiving portion receiving a response corresponding to said information from said processing unit (200, 300), and

a sensing portion sensing a failure in said processing unit (200, 300) based on said information and said response.

2. The failure sensing device according to claim 1, wherein

said information is input data for calculation at said processing unit (200, 300), and

said receiving portion receives as a response a calculation result of said input data substituted into a predetermined calculation formula at said processing unit (200, 300).

3. The failure sensing device according to claim 1, wherein

said control unit (100, 110, 120) further includes a diagnosing portion diagnosing a failure in itself.

4. The failure sensing device according to claim 1, wherein
said control unit (100, 110, 120) is configured by multiplexed calculating units.

5. The failure sensing device according to claim 1, wherein
said control unit (100, 110, 120) further includes a determining portion determining interruption of control in which additional information from said processing unit (200, 300) is reflected, when a failure of said processing unit (200, 300) is sensed by said sensing portion.

6. The failure sensing device according to claim 1, wherein
said control unit (100, 110, 120) is configured by a plurality of control units (100, 110, 120) controlling an operation of a vehicle, and
said control unit (100, 110, 120) further includes a sensing portion sensing a failure in said processing unit (200, 300) based on a plurality of sensing results from sensing portions included in said plurality of control units (100, 110, 120).

7. The failure sensing device according to claim 6, wherein
priorities as to failure sensing are assigned to said plurality of control units (100, 110, 120).

8. The failure sensing device according to claim 7, wherein
control units (100, 110, 120) with smaller control loads are given higher priorities.

9. (Amended) A failure sensing device of a vehicle control system including a control unit (100, 110, 120) generating a control target based on an operation request for controlling a driving state of a vehicle by manipulating a corresponding actuator using the generated control target, and a processing unit (200, 300) connected to said

control unit (100, 110, 120) by a network, for generating and providing to said control unit (100, 110, 120) additional information to be used to modify said operation request or said control target, as necessary, at said control unit (100, 110, 120), wherein

said failure sensing device is provided to said control unit (100, 110, 120) with smaller control load, and includes

an output portion outputting information to said processing unit (200, 300) with greater control load,

a receiving portion receiving a response corresponding to said information from said processing unit (200, 300), and

a sensing portion sensing a failure in said processing unit (200, 300) based on said information and said response, wherein

units in said vehicle control system are hierarchically configured, and

said control unit (100, 110, 120) is arranged hierarchically lower than said processing unit (200, 300).

10. (Amended) A failure sensing device of a vehicle control system including a control unit (100, 110, 120) generating a control target based on an operation request for controlling a driving state of a vehicle by manipulating a corresponding actuator using the generated control target, and a processing unit (200, 300) connected to said control unit (100, 110, 120) by a network, for generating and providing to said control unit (100, 110, 120) additional information to be used to modify said operation request or said control target, as necessary, at said control unit (100, 110, 120), wherein

said failure sensing device is provided to said control unit (100, 110, 120) with smaller control load, and includes

outputting means for outputting information to said processing unit (200, 300) with greater control load,

receiving means for receiving a response corresponding to said information from said processing unit (200, 300), and

sensing means for sensing a failure in said processing unit (200, 300) based on said information and said response.

11. The failure sensing device according to claim 10, wherein

said information is input data for calculation at said processing unit (200, 300), and

said receiving means includes means for receiving as a response a calculation result of said input data substituted into a predetermined calculation formula at said processing unit (200, 300).

12. The failure sensing device according to claim 10, wherein

said control unit (100, 110, 120) further includes diagnosing means for diagnosing a failure in itself.

13. The failure sensing device according to claim 10, wherein

said control unit (100, 110, 120) is configured by multiplexed calculating units.

14. The failure sensing device according to claim 10, wherein

said control unit (100, 110, 120) further includes means for determining interruption of control in which additional information from said processing unit (200, 300) is reflected, when a failure of said processing unit (200, 300) is sensed by said sensing means.

15. The failure sensing device according to claim 10, wherein

said control unit (100, 110, 120) is configured by a plurality of control units (100, 110, 120) controlling an operation of a vehicle, and

said control unit (100, 110, 120) further includes means for sensing a failure in said processing unit (200, 300) based on a plurality of sensing results from sensing

means included in said plurality of control units (100, 110, 120).

16. The failure sensing device according to claim 15, wherein

priorities as to failure sensing are assigned to said plurality of control units (100, 110, 120).

17. The failure sensing device according to claim 16, wherein

control units (100, 110, 120) with smaller control loads are given higher priorities.

18. (Amended) A failure sensing device of a vehicle control system including a control unit (100, 110, 120) generating a control target based on an operation request for controlling a driving state of a vehicle by manipulating a corresponding actuator using the generated control target, and a processing unit (200, 300) connected to said control unit (100, 110, 120) by a network, for generating and providing to said control unit (100, 110, 120) additional information to be used to modify said operation request or said control target, as necessary, at said control unit (100, 110, 120), wherein

said failure sensing device is provided to said control unit (100, 110, 120) with smaller control load, and includes

outputting means for outputting information to said processing unit (200, 300) with greater control load,

receiving means for receiving a response corresponding to said information from said processing unit (200, 300), and

sensing means for sensing a failure in said processing unit (200, 300) based on said information and said response, wherein

units in said vehicle control system are hierarchically configured, and

said control unit (100, 110, 120) is arranged hierarchically lower than said processing unit (200, 300).